Questions 2, 4, 5, 6, 9, 19, 27 – 49 odd, 95, 101

2) c. Air pressure outside the tube counterbalances the weight of the mercury in the tube.

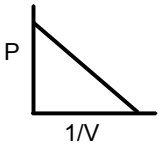
4) The density inside a rigid container would remain the same when heated.

In a piston with a constant pressure, heating the gas would cause the volume to expand, thus decreasing the density of the gas.

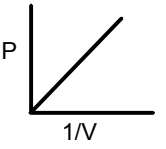
5) e. Nothing

6) Most of the water stays in the straw because the air molecules at the bottom of the straw push up against the surface of the water, holding the liquid up.

9) d. When heated, the gas expands, so some of the molecules are forced to escape out the bottom. Thus fewer molecules occupy the same volume. This decreased density causes the balloon to rise.

19) 


The last graph is false because pressure is directly proportional to the inverse of volume. Like this →




27) $\frac{4.8 \text{ atm}}{1 \text{ atm}} \left| \frac{760 \text{ mmHg}}{} \right. = 3{,}600 \text{ mmHg} = 3{,}600 \text{ torr}$

$\frac{4.8 \text{ atm}}{1 \text{ atm}} \left| \frac{101.3 \text{ KPa}}{} \right. = 490 \text{ KPa} = 4.9 \times 10^5 \text{ Pa}$

$\frac{4.8 \text{ atm}}{1 \text{ atm}} \left| \frac{14.7 \text{ psi}}{} \right. = 71 \text{ psi}$

29) 6.5cm = 65 mmHg = 65 torr

$\frac{65 \text{ mm Hg}}{760 \text{ mm Hg}} \left| \frac{1 \text{ atm}}{} \right. = 0.086 \text{ atm}$

31) a. P = 760. torr - 118 torr = 642 torr

$\frac{642 \text{ torr}}{760 \text{ torr}} \left| \frac{1 \text{ atm}}{} \right. = 0.845 \text{ atm}$ $\frac{642 \text{ torr}}{760 \text{ torr}} \left| \frac{101.3 \text{ KPa}}{} \right. = 85.6 \text{ KPa}$

b. P = 760. + 215 torr = 975 torr = 1.28 atm =- 130. KPa

c. P = 635 - 118 torr = 517 torr
P = 635 + 215 torr = 850. torr

33) $P_1V_1 = P_2V_2$

(760mmHg)(2.0L) = (500.mmHg) $V_2$

***$V_2$ = 3.0L*** - It will burst

35) $n_1/V_1 = n_2/V_2$

$\frac{0.50\text{mol}}{11.2\text{L}} = \frac{n_2}{20.\text{L}}$ ***$n_2$ = 0.89 mol*** $N_{2(g)}$

37) a. PV=nRT

5.00 V = 2.00 (0.08206) 428

***V = 14.0 L***

b. PV=nRT

0.300 (2.00) = n (0.08206) 155

***n = 0.0472 mol***

c. 4.47 (25.0) = 2.01 (0.08206) T

***T = 678K or 205°C***

d. P (2.25) = 10.5 (0.08206) 348

***P = 133 atm***

39) 135 (200.0) = n (0.08206) 297

n = 1,108mol

$\frac{1{,}108\text{ mol He} \mid 4.003\text{ g He}}{1\text{ mol He}} = 4{,}430\text{ g He}$

$\frac{1{,}108\text{ mol } H_2 \mid 2.016\text{ g } H_2}{1\text{ mol } H_2} = 2{,}230\text{ g } H_2$

41) $\frac{175\text{ g Ar} \mid 1\text{ mol Ar}}{39.95\text{ g Ar}} = 4.38\text{ mol Ar}$

a. PV=nRT

10.0 (2.50) = 4.38 (0.08206) T

***T = 69.6 K***

b. PV=nRT

P (2.50) = 4.38 (0.08206) 225

***P = 32.5 atm***

43) a. PV=nRT

0.5263 atm V = 1.50 (0.08206) 298

V = 69.7L

b. PV=nRT

1.052atm (69.7L) = n (0.08206) 323

n = 2.766 mol

- 1.50 mol

***1.27 mol***

45) a. PV=nRT

$P_A$ (1.0L) = 1.0 (0.08206) 280.

$P_A$ = 22.3 atm

b. PV=nRT

$P_B$ (2.0L) = 2.0 (0.08206) 560.

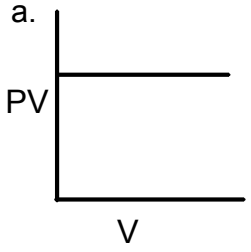
$P_B$ = 46.0 atm

The pressure of the unknown gas B is double the pressure of gas A.

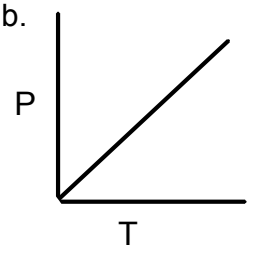
47) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\frac{710\text{torr (500.mL)}}{303\text{ K}} = \frac{P_2\text{ (25mL)}}{1{,}093\text{K}}$ $P_2$ = 51,000 torr

49) $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$ $\frac{760\text{torr}\ (1.00\text{L})}{296\ \text{K}} = \frac{220.\text{torr}\ V_2}{242\text{K}}$ $V_2 = 1.82$ L

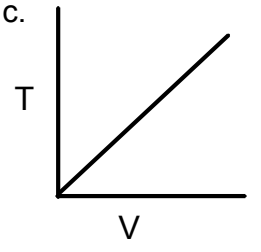
95) a.



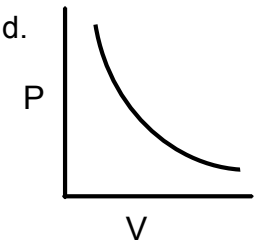

b.



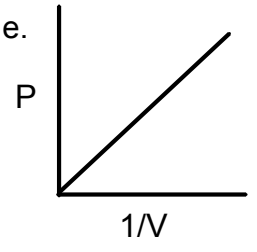

c.



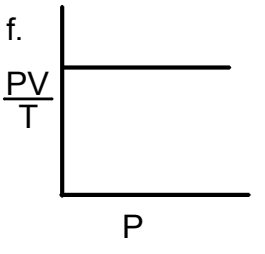

d.




e.




f.




101) $P_1V_1 = P_2V_2$ $200.\text{atm}\ (15.0\text{L}) = 1.00\ \text{atm}\ V_2$

$V_2 = 3000 - 15 = \frac{2985\text{L} \mid 1\ \text{balloon}}{2.00\text{L}} = 1490$ balloons